Correcion Prueba

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ejercicio 1

a)

$$cov(x_t, x_s) = \left(\sum_{i=1}^{n} a(s_i) f(s_i, \sum_{j=1}^{n} a(s_j) f(s_j)) \right)$$

$$\mathbb{E}\left[\left(\sum_{i=1}^{n} a(s_i) f(s_i) - \mathbb{E}\left[\sum_{i=1}^{n} a(s_i) f(s_i) \right] \right) \left(\sum_{j=1}^{n} a(s_j) f(s_j)) - \mathbb{E}\left[\sum_{j=1}^{n} a(s_j) f(s_j) \right] \right) \right]$$

$$\mathbb{E}\left[\left(\sum_{i=1}^{n} a(s_i) f(s_i) - \sum_{i=1}^{n} f(s_i) \mathbb{E}\left[a(s_i) \right] \right) \left(\sum_{j=1}^{n} a(s_j) f(s_j)) - \sum_{j=1}^{n} f(s_j) \mathbb{E}\left[a(s_j) \right] \right) \right]$$

$$\sum_{j=1}^{n} \sum_{i=1}^{n} f(s_j) f(s_i) * cov(a(s_i), a(s_j))$$

Ejercicio 2

nugget:

$$\lim_{h \to 0} \alpha + \beta(1 - \exp(-3h/\theta))$$

$$\lim_{h \to 0} \alpha$$

$$\lim_{h \to 0} \beta(1 - \exp(-3h/\theta)) = 0$$

umbral:

$$\lim_{h \to 0} \alpha + \beta(1 - \exp(-3h/\theta)) = \alpha + \beta$$

umbral parcial:

umbral parcial $= \alpha + \beta - \alpha = \beta$

Ejercicio 3

a)

$\mathbb{E}[\epsilon(s)] = 0$

$K_i = \rho(s_i, s_0)$

entonces:

$$\hat{X}(s_0) = m(s)'\beta + K' (\Sigma)^{-1} (Z - m(s)'\beta)$$

$$\rightarrow \mathbb{E}[X_s] = m(s)'\beta$$

b) Estimamos β y Σ mediante maxima verosimilitud

$$log(\mathcal{L}) = \frac{-nlog(2\pi\Sigma)}{2} - (Z - M'\beta)\Sigma^{-1}(Z - M'\beta)'$$

despejamos la log-likelihood para β y Σ:

$$\hat{\beta} = (M'\Sigma^{-1}M)^{-1}(Z\Sigma^{-1}M)$$
$$\hat{\Sigma} = \frac{n}{2(Z - M'\beta)(Z - M'\beta)'}$$

esto se resuelve con metodos de optimizacion como BFGS.

Ejercicio 4

Ejercicio 5